

REMARKS/ARGUMENTS

Claims 1-16 have been cancelled. New Claims 17-30 have been added.

Claim 17 is directed to a method of preparing a storage-stable aqueous dispersion of a polyurethane, an epoxy resin, and an amine crosslinker for said epoxy resin. Claims 18-26 are directed to storage stable aqueous dispersions and adhesives made by the process of Claim 17. Claims 27 and 30 are directed to methods of laminating paper, polymer film, and leather to wood and other flat surfaces. Claims 28 and 29 are directed to paper, polymer film, and leather coated with an aqueous dispersion of Claim 18 or 19 and an adhesive of Claim 25, respectively. Support for Claims 17, 18 and 19 is found in original Claim 9, Examples 1 and 2 (Spec., pp. 15-18), and the following pages of the Specification:

“storage-stable aqueous dispersion” p. 1, ll. 31-32; p. 1, ll. 38-40; p. 2, ll. 19-21;

“adding epoxy resin (1) which is a reaction product of a compound having an epoxide group and a diol or polyol, to a solvent solution of a polyurethane (2) having hydrophilic groups, to form a mixture” p. 5, l. 16, to p. 11, l. 39; p. 12, l. 9, to p. 12, l. 24;

“dispersing said mixture in water to form an aqueous dispersion of (1) and (2)”
p. 13, ll. 10-15;

“optionally, removing at least 90% by weight of said solvent,” p. 12, ll. 1-4;
and

“adding an amine crosslinker (3) for the epoxy resin (1) to the aqueous dispersion of (1) and (2)” p. 13, ll. 16-29; p. 14, ll. 1-24.

“adding a non-blocked amine crosslinker (3) for the epoxy resin (1) to the aqueous dispersion of (1) and (2)” p. 13, ll. 16-29; p. 14, ll. 1-24.

Support for Claim 20 is found in the Specification at p. 2, ll. 22, to p. 5, l. 39, and original Claim 3. Support for Claim 21 is found in the Specification at p. 12, ll. 11-24, and original Claim 4. Support for Claim 22 is found in the Specification at p. 13, l. 20, to p. 14,

l. 2, and original Claim 5. Support for Claim 23 is found in the Specification at p. 12, ll. 31-32, and original Claim 8. Support for Claims 24-30 is found in the Specification at p. 14, l. 35, to p. 15, l. 34. No new matter has been added.

The storage-stable aqueous dispersions of new Claims 18 and 19 are necessarily made by the method of Claim 17. Unless the epoxy resin is first added to the solvent solution of the polyurethane to form a mixture, the mixture is thereafter dispersed in water, and finally the non-blocked amine crosslinker for the epoxy resin is added to the dispersion water, in that particular order, the aqueous dispersion formed including the active amine crosslinker is not storage-stable. Without being bound by any theory, Applicant believes that the epoxy resin becomes surrounded and/or enclosed by the more hydrophilic polyurethane when the mixture formed by adding the epoxy resin to the solvent solution of the polyurethane is dispersed in water. Because the epoxy resin becomes situated inside the hydrophilic polyurethane when the mixture is dispersed in the water, the epoxy resin is protected from the active amine crosslinker for the epoxy resin added to the dispersion water thereafter. Therefore, the aqueous dispersion of the hydrophilic polyurethane, the epoxy resin, and the amine crosslinker for the epoxy resin formed by the process of Claim 17 is storage stable.

1. The rejections under 35 U.S.C. §102(b) over Rosthauser

Cancelled Claims 1-9 were rejected under 35 U.S.C. §102(b) as anticipated by Rosthauser (Rosthauser et al., U.S. Patent 4,925,885, issued May 15, 1990 (Office Action (OA), dated July 1, 2008). Specifically referring to Rosthauser's Abstract, the Examiner finds that (1) Rosthauser's aqueous dispersions of a polyurethane and an epoxy resin are stable, and (2) the isocyanate reactive groups of Rosthauser's polyisocyanate crosslinkers for the epoxy resin component of the aqueous dispersions are blocked (OA, pp. 3-5; particularly p. 4, (5)(6)(7)). Because Rosthauser does not describe any amine crosslinker for the epoxy resin component in its stable aqueous dispersion and does not describe any crosslinker with

non-blocked reactive amine groups for the epoxy resin component in its stable aqueous dispersion, Rosthauser's disclosure does not describe all the elements of any invention Applicant now claims. Therefore, the Examiner's rejections under 35 U.S.C. §102(b) as anticipated by Rosthauser do not bar the patentability of Applicant's new claims.

2. The rejections under 35 U.S.C. §102(b) over Miyamoto

Cancelled Claims 1-4, 8, 9, and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by Miyamoto (Miyamoto et al., U.S. Patent 5,656,701, issued August 12, 1997 (OA, pp. 5-6). The Examiner directs Applicant's attention to Miyamoto's teaching at col. 9, ll. 7-12 and 20-52; col. 15, ll. 39-43; and col. 3, l. 5, to col. 4, l. 34, and col. 4, l. 44, to col. 6, l. 12.

New Claim 18 is directed to storage-stable aqueous dispersions of an epoxy resin which is a reaction product of a compound having an epoxide group and a diol or polyol, a polyurethane having hydrophilic groups, and an amine crosslinker for the epoxy resin made by the method of new Claim 17. New Claim 18 is directed to storage-stable aqueous dispersions of an epoxy resin which is a reaction product of a compound having an epoxide group and a diol or polyol, a polyurethane having hydrophilic groups, and a non-blocked amine crosslinker for the epoxy resin made by the method of new Claim 17. For anticipation under 35 U.S.C. §102(b), the Examiner must find that Miyamoto describes every element of a process and a storage-stable aqueous dispersion made by a process Applicant claims. The Examiner has not established that Miyamoto describes every element of a process and every element of a storage-stable aqueous dispersion made by a process Applicant now claims. Moreover, Applicant finds that Miyamoto does not describe every element of a process or a storage-stable aqueous dispersion made by a process Applicant now claims.

First, Miyamoto suggests that "crosslinking agents other than epoxy resins" may be added to its inks (Miyamoto, col. 9, ll. 7-12), but Miyamoto does not describe either a

blocked or non-blocked amine crosslinker for an epoxy resin, as Applicant's claims require. Moreover, while Miyamoto teaches that dispersions of the polyurethane resins described may be used as an aqueous laminating adhesive (Miyamoto, col. 9, ll. 20-25), Miyamoto states (Miyamoto, col. 9, ll. 25-40):

[T]he aqueous polyurethane resin of the present invention may be used in combination with an epoxy resin that is selected from among the epoxy resins that have been listed herein above as crosslinking components of the aqueous printing ink composition. . . .

In the case under consideration, the aqueous polyurethane resin specified herein is mixed with the epoxy resin at a weight ratio that typically ranges from 99:1 to 50:50 (polyurethane resin: epoxy resin)

At col. 15, ll. 12-42, Miyamoto describes aqueous ink and adhesive compositions including an aqueous polyurethane resin and bisphenol A diglycidyl ether as the epoxy resin. At col. 8, ll. 48-64, Miyamoto provides examples of suitable epoxy resins, including a bisphenol-epichlorohydrin epoxy resin. However, no crosslinker, whether it has a reactive amine group or not or whether it has non-blocked or blocked reactive groups, is described by Miyamoto.

At col. 3, l. 5, to col. 4, l. 34, Miyamoto does describe diisocyanate chain extenders for use with the polyurethane resins of the compositions described. However, Miyamoto does not teach that those chain extenders are crosslinkers for an additional epoxy resin component, are amine crosslinkers for an epoxy resin component, or are non-blocked amine crosslinkers for an epoxy resin component. At col. 4, l. 44, to col. 6, l. 12, Miyamoto appears to describe the amine chain extenders for use in extending the chains of urethane prepolymers, but these are not amine crosslinkers for an epoxy resin component. Moreover, Miyamoto does not appreciate the order of the processing steps and the kinds of components the method of Applicant's present Claim 17 requires to produce a storage-stable aqueous dispersion comprising a polyurethane, an epoxy resin, and an active amine crosslinker for the epoxy resin in the aqueous dispersions of Applicant's new Claims 18 and 19.

In short, Miyamoto does not describe every element of Applicant's new claims.

Therefore, the Examiner's rejections under 35 U.S.C. §102(b) as anticipated by Miyamoto do not bar the patentability of Applicant's new claims.

3. The rejection under 35 U.S.C. §103 for obviousness over Miyamoto and Kobayashi

Cancelled Claims 5-7 were rejected under 35 U.S.C. §103(a) as obvious in view of Miyamoto and Kobayashi (U.S. Patent 5,662,966, issued September 2, 1997 (OA, pp. 6-7). Kobayashi is cited for its teaching at col. 7, ll. 7-43, of crosslinking agents useful for improving the durability of aqueous polyurethane coatings. Such agents include "aqueous blocking-type polyisocyanate crosslinking agent; water-dispersible, NCO group-blocking polyisocyanate crosslinking agents; melamine-based crosslinking agents; epoxy-based crosslinking agents; polyaziridine-based crosslinking agents and the like" (Kobayashi, col. 7, ll. 12-17). While Kobayashi's polyurethane coatings "may be incorporated with different dispersions of . . . epoxy . . . -based resins (Kobayashi, col. 7, ll. 33-37) and may be applied to a wide variety of substrates (Kobayashi, col. 7, ll. 38-43), Kobayashi does not describe an amine crosslinker for the epoxy resin component of an aqueous dispersion of polyurethane and epoxy resins, does not appreciate the order of processing steps and the kinds of components required to produce a storage-stable aqueous dispersion comprising a polyurethane, an epoxy resin, and an active amine crosslinker for the epoxy resin, and does not satisfy the deficiencies in Miyamoto's disclosure.

Accordingly, the process and products made by the process of Applicant's new Claims 17-19 would not have been obvious to a person having ordinary skill in the art in view of the combined teachings of Miyamoto and Kobayashi. Therefore, the Examiner's rejections under 35 U.S.C. §103(a) do not apply to Applicant's new claims.

4. The rejection under 35 U.S.C. §103 for obviousness over Rosthauser and Kobayashi

Cancelled Claim 15 was rejected under 35 U.S.C. §103(a) as obvious in view of Rosthauser and Kobayashi. Kobayashi does not satisfy the deficiencies in Rosthauser's disclosure relative to Applicant's new claims. Accordingly, the process and products made by the process of Applicant's new Claims 17-19 would not have been obvious to a person having ordinary skill in the art in view of the combined teachings of Rosthauser and Kobayashi. Therefore, the Examiner's rejections under 35 U.S.C. §103(a) do not apply to Applicant's new claims.

5. The rejection under 35 U.S.C. §§ 112, 2nd para., and 101

The Examiner rejected cancelled Claims 10-13 and 16 under 35 U.S.C. §112, 2nd para., as indefinite without active, positive method steps. Claims 10-13 and 16 have been cancelled and replaced by new Claims 17-30 which meet the demands of 35 U.S.C. §112, 2nd para.. The Examiner rejected cancelled Claims 10-13 and 16 under 35 U.S.C. §101 as directed to unpatentable subject matter. Claims 10-13 and 16 have been cancelled and replaced by new Claims 17-30 which are directed to patentable subject matter under 35 U.S.C. §101.

6. Evidence in support of the patentability of Applicant's new claims

The Examiner should consider the storage-stability reported for Applicant's claimed adhesive aqueous dispersions in Applicant's III) Performance tests (Spec., p. 15, l. 36, to p. 18, l. 7). For Adhesive A (epoxy resin + polyurethane resin + active amine crosslinker) and Adhesive B (epoxy resin + polyurethane resin + active amine crosslinker) "of the invention there is virtually no drop in the [peel strength] values even after 2 weeks of storage of the coated film as compared with the initial values" (Spec., p. 17, l. 19-20; and Tables on pp. 17 and 18).

CONCLUSION

For the reason stated herein, the subject matter now claimed is patentable to Applicant, and the Examiner should send Applicant's new Claims 17-30 to issue.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'R. Treanor', is written over a horizontal line.

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